

Regional Geoscience Studies and Petroleum Potential, Peel Plateau and Plain

March 2008

Peel Plateau and Plain (Peel Region) lie along the northern Mackenzie Corridor. Peel Region has widespread hydrocarbon potential, but is under-explored and its geological history is poorly understood. More than 70 exploratory wells have been drilled in Peel Region. Some wells had encouraging hydrocarbon shows, yet no major discoveries.

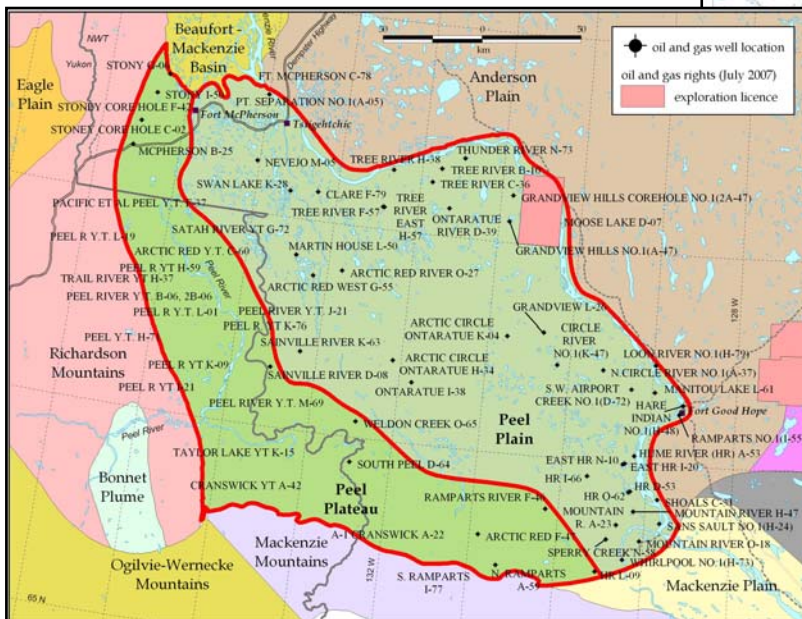


Regional Geoscience Studies
& Petroleum Potential,
Peel Plateau & Plain

OBJECTIVES

The project aims to improve knowledge of regional geology, including:

- stratigraphy and correlation;
- depositional and tectonic histories;
- basin evolution; and
- petroleum geology and potential.



Peel Plateau and Plain, a petroleum exploration region of NWT and Yukon

This project is a collaboration among the Geological Survey of Canada (GSC), Northwest Territories Geoscience Office (NTGO), Yukon Geological Survey (YGS), universities, northerners, and industry.

Communities, petroleum wells, and exploration licenses in Peel Region



PRODUCTS & INFORMATION

CURRENT

- Project web page & contact information: www.nwtgeoscience.ca/petroleum/PeelPlateau.html
- Synthesis of Geoscience Knowledge, Peel Plateau and Plain Region, Northern Mackenzie Corridor*
- Various publications from 2005 to 2008 including field work & project updates (open files & reports, Current Research articles, conference abstracts)

FUTURE

- Final project volume and results compilation
- Peel Petroleum Project geodatabase and GIS
- Results of thematic subsurface & outcrop studies
- Quantitative resource assessment



Paleozoic platformal succession, Mackenzie Mountain front

SUMMER 2007 FIELD WORK

Field studies continued from 2006 work, with objectives to better understand stratigraphic and structural relationships, depositional histories, and petroleum potential. The crew was again helicopter-supported and moved westward to span the map-areas of Trail River (106L), Sans Sault Rapids (NTS 106H), Upper Ramparts River (NTS 106G), and Snake River (NTS 106F).

Research on Lower to Upper Devonian age rocks included measuring 14 stratigraphic sections; these were described in detail. Several other sites were visited, with about 70 samples collected for sedimentary petrology (composition and characteristics), source rock and reservoir potential, microfossil analysis, oil chemistry, and provenance studies. Two gamma ray profiles of Devonian source rocks (Hare Indian and Canol Formations) were conducted from sections that were identified last year. This will enable our field observations to be directly correlated to drill hole gamma logs throughout the NWT. As part of a provenance study, mainly of the Imperial Formation, 22 shale samples were collected spanning the entire Paleozoic succession to be analyzed for whole rock geochemistry and three detrital zircon samples were collected. The Upper Devonian to Mississippian Tuttle Formation and its clastics play were further evaluated in Yukon. Four sections of Cretaceous age rocks were revisited and measured in detail. Three of these sections were of the Martin House Formation, the most prospective reservoir unit within the Cretaceous stratigraphy of the study area. In addition, detailed sedimentological and ichnological observations were made.

Two students were supported to produce a B.Sc. thesis on detailed sedimentology of the Imperial Formation, and an M.Sc. thesis on Cretaceous biostratigraphy (using Foraminifera).

Current research has and will be presented at a number of events, including the CSPG Gussow Geoscience Conference *Arctic Energy Exploration* in October 2007, the Yellowknife and Yukon Geoscience forums in November 2007 and 2008, AAPG convention in April 2008, CSPG and GAC/MAC annual conventions in May 2008, and the Inuvik Petroleum Show in June 2008.

PROJECT TIMELINES

Year 1 (2005-2006): reconnaissance field program, project ramp-up phase

Year 2 (2006-2007): primary field season

Year 3 (2007-2008): secondary field season and data analyses

Year 4 (2008-2009): write-up and completion phase of the project